

Degradation of enriched biodiesel under different storage conditions

ABSTRACT

Although the commercial prospects for biodiesel have grown, some concern remains with respect to its resistance to oxidative degradation during storage. The presence of double bonds in the molecule induces a high level of reactivity with oxygen when it makes direct contact with air. Consequently, biodiesel storage over extended periods can lead to increased degradation of fuel properties, which can compromise fuel quality. This work used enriched biodiesel samples prepared by enriching palm oil methyl ester (PME) with methyl oleate (MO) at specified volumetric proportions (% v/v) PME80/MO20, PME70/MO30, PME60/MO40, and PME50/MO50 to determine the effects of long storage under two different conditions. The samples were stored either unexposed to air and daylight or exposed to air and daylight for 200 days. At regular intervals, the following physicochemical properties of the samples were measured: kinematic viscosity (KV), acid value (AV), higher heating value (HHV), and peroxide value (PV). Samples showed small differences under unexposed condition for KV, AV, HHV, and PV; however, samples showed significantly large differences under exposed condition. Biodiesel exposed to air and daylight tended to degrade at a faster rate than biodiesel under unexposed condition. The measured parameters of tested samples were not affected under unexposed condition but were affected under exposed condition.

Keyword: Enriched biodiesel; Storage conditions; Kinematic viscosity; Acid value; Higher heating value; Peroxide value